

TECHNICAL REPORT
NATICK/TR-84/008

AD

RECIPE DEVELOPMENT AND EVALUATION OF THE 1983 REVISION OF THE STANDARD B RATION

BY
VIRGINIA M. WHITE

APPROVED FOR
PUBLIC RELEASE;
DISTRIBUTION
UNLIMITED.

APRIL 1983

UNITED STATES ARMY NATICK
RESEARCH & DEVELOPMENT CENTER
NATICK, MASSACHUSETTS 01760



FOOD ENGINEERING LABORATORY

Approved for public release; distribution unlimited.

Citation of trade names in this report does not constitute an official indorsement or approval of the use of such items.

Destroy this report when no longer needed. Do not return it to the originator.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

S **DLIC** **ELECTE** **D**
 FEB 28 1984
 A

PREFACE

For the 1983 revision of the Standard B Ration for the Armed Forces - SB 10-495 - the staff of Natick Laboratories' Experimental Kitchens developed numerous new recipes and revised existing ones. A field test of the new menu was performed to determine the accuracy of preparation instructions, recipe yield, preparation time, and staffing requirement, as well as overall menu acceptance. All aspects of the menus were determined to be satisfactory except for the poor quality of dehydrated meats.

The work on this project was performed under Production Engineering in Support of the DoD Food Program O&MA .10, in support of M.S.R.-AAFMCS-3 improved B Ration Menus/Recipes.

Acknowledgement is made to the following military personnel assigned to the Experimental Kitchens, who assisted in either recipe development or field testing of the menus: SFC Jesus Perez, SFC John McPhee, SSG Paul Normand, SP5 Kathy Gendusa, and SPR Ivan Chiam. The valuable procedural assistance of CW2 Rufus Montgomery during the test phase is also gratefully acknowledged.

Because US customary units are used in menu preparation, such units rather than the International System are used in this report.

This paper was written using a 1983 draft revision of the B ration. The recipe numbers for the Standard Operational B ration, SB10-495, will be changed when published.



Accession For
 1. 6741
 2. 6742
 3. 6743
 4. 6744
 5. 6745
 6. 6746
 7. 6747
 8. 6748
 9. 6749
 10. 6750
 11. 6751
 12. 6752
 13. 6753
 14. 6754
 15. 6755
 16. 6756
 17. 6757
 18. 6758
 19. 6759
 20. 6760
 21. 6761
 22. 6762
 23. 6763
 24. 6764
 25. 6765
 26. 6766
 27. 6767
 28. 6768
 29. 6769
 30. 6770
 31. 6771
 32. 6772
 33. 6773
 34. 6774
 35. 6775
 36. 6776
 37. 6777
 38. 6778
 39. 6779
 40. 6780
 41. 6781
 42. 6782
 43. 6783
 44. 6784
 45. 6785
 46. 6786
 47. 6787
 48. 6788
 49. 6789
 50. 6790
 51. 6791
 52. 6792
 53. 6793
 54. 6794
 55. 6795
 56. 6796
 57. 6797
 58. 6798
 59. 6799
 60. 6800
 61. 6801
 62. 6802
 63. 6803
 64. 6804
 65. 6805
 66. 6806
 67. 6807
 68. 6808
 69. 6809
 70. 6810
 71. 6811
 72. 6812
 73. 6813
 74. 6814
 75. 6815
 76. 6816
 77. 6817
 78. 6818
 79. 6819
 80. 6820
 81. 6821
 82. 6822
 83. 6823
 84. 6824
 85. 6825
 86. 6826
 87. 6827
 88. 6828
 89. 6829
 90. 6830
 91. 6831
 92. 6832
 93. 6833
 94. 6834
 95. 6835
 96. 6836
 97. 6837
 98. 6838
 99. 6839
 100. 6840
 101. 6841
 102. 6842
 103. 6843
 104. 6844
 105. 6845
 106. 6846
 107. 6847
 108. 6848
 109. 6849
 110. 6850
 111. 6851
 112. 6852
 113. 6853
 114. 6854
 115. 6855
 116. 6856
 117. 6857
 118. 6858
 119. 6859
 120. 6860
 121. 6861
 122. 6862
 123. 6863
 124. 6864
 125. 6865
 126. 6866
 127. 6867
 128. 6868
 129. 6869
 130. 6870
 131. 6871
 132. 6872
 133. 6873
 134. 6874
 135. 6875
 136. 6876
 137. 6877
 138. 6878
 139. 6879
 140. 6880
 141. 6881
 142. 6882
 143. 6883
 144. 6884
 145. 6885
 146. 6886
 147. 6887
 148. 6888
 149. 6889
 150. 6890
 151. 6891
 152. 6892
 153. 6893
 154. 6894
 155. 6895
 156. 6896
 157. 6897
 158. 6898
 159. 6899
 160. 6900
 161. 6901
 162. 6902
 163. 6903
 164. 6904
 165. 6905
 166. 6906
 167. 6907
 168. 6908
 169. 6909
 170. 6910
 171. 6911
 172. 6912
 173. 6913
 174. 6914
 175. 6915
 176. 6916
 177. 6917
 178. 6918
 179. 6919
 180. 6920
 181. 6921
 182. 6922
 183. 6923
 184. 6924
 185. 6925
 186. 6926
 187. 6927
 188. 6928
 189. 6929
 190. 6930
 191. 6931
 192. 6932
 193. 6933
 194. 6934
 195. 6935
 196. 6936
 197. 6937
 198. 6938
 199. 6939
 200. 6940
 201. 6941
 202. 6942
 203. 6943
 204. 6944
 205. 6945
 206. 6946
 207. 6947
 208. 6948
 209. 6949
 210. 6950
 211. 6951
 212. 6952
 213. 6953
 214. 6954
 215. 6955
 216. 6956
 217. 6957
 218. 6958
 219. 6959
 220. 6960
 221. 6961
 222. 6962
 223. 6963
 224. 6964
 225. 6965
 226. 6966
 227. 6967
 228. 6968
 229. 6969
 230. 6970
 231. 6971
 232. 6972
 233. 6973
 234. 6974
 235. 6975
 236. 6976
 237. 6977
 238. 6978
 239. 6979
 240. 6980
 241. 6981
 242. 6982
 243. 6983
 244. 6984
 245. 6985
 246. 6986
 247. 6987
 248. 6988
 249. 6989
 250. 6990
 251. 6991
 252. 6992
 253. 6993
 254. 6994
 255. 6995
 256. 6996
 257. 6997
 258. 6998
 259. 6999
 260. 7000
 261. 7001
 262. 7002
 263. 7003
 264. 7004
 265. 7005
 266. 7006
 267. 7007
 268. 7008
 269. 7009
 270. 7010
 271. 7011
 272. 7012
 273. 7013
 274. 7014
 275. 7015
 276. 7016
 277. 7017
 278. 7018
 279. 7019
 280. 7020
 281. 7021
 282. 7022
 283. 7023
 284. 7024
 285. 7025
 286. 7026
 287. 7027
 288. 7028
 289. 7029
 290. 7030
 291. 7031
 292. 7032
 293. 7033
 294. 7034
 295. 7035
 296. 7036
 297. 7037
 298. 7038
 299. 7039
 300. 704

TABLE OF CONTENTS

	Page
PREFACE	1
LIST OF ILLUSTRATIONS	4
INTRODUCTION	5
B RATION RECIPE DEVELOPMENT	13
Ingredients	13
Cooking Equipment	15
Water Requirements	15
FIELD TESTING THE MENU	15
Objectives	15
Methods	18
Findings	18
Acceptance Scale	20
RESULTS AND DISCUSSION	20
CONCLUSION	20
APPENDIXES	
A. List of Standard B Ration Items	26
B. Restricted Use Items in B Ration	30
C. Comments of Home Economist	31
D. Sample B Ration Rating Sheet	34

LIST OF ILLUSTRATIONS

		Page
Figure		
1	Gasoline Field Range, M-1959	16
Table		
1	Ten-Day Menu	6
2	New Recipes Added to Revision of B Ration, 1983	14
3	Water Requirements Per Meal for the Standard B Ration 10-Day Cycle Menu	17
4	Ratings of Selected Items and Each Menu as a Whole of 10-Day B Ration Menu Cycle	21

DEVELOPMENT AND EVALUATION OF THE 1983 REVISION OF THE STANDARD B RATION

INTRODUCTION

The Standard B Ration is planned for members of the Armed Forces as subsistence during operations that permit organized dining facilities but that preclude use of perishable foods. Although only nonperishable foods are used, as soon as perishable supplies are available, every effort is made to substitute fresh counterparts. Because the B Ration is supplied by line item and issued against planned menus, it is designed to facilitate such line-item substitution.

The Standard B Ration specification is published as two separate documents: The Standard B Ration for the Armed Forces, SB10-495/NAVSUP Pub 274/AFM 146-4/MCO P10110.26B, and the Standard B Hospital Ration SB10-495-1/NAVSUP Pub 436/AFM 146-9/MCO P10110.26A. This report will deal only with the revision of the Standard B Ration.¹ The Hospital Ration has not been revised since 1968, but work on its revision has been initiated.

Representatives from the Army, Navy, Air Force, Marines, Natick Laboratories (NLABS), the Office of the Surgeon General, and the Academy of Health Sciences met in November 1976 to plan the revision of SB10-495. At the meeting the 10-day menus were reviewed and revised. The attendees agreed that although all items then listed in the Federal Supply Catalogue² should be considered for use in the Ration menu, the number of line items should be kept at the minimum needed to furnish menu variety. A draft menu was prepared, and the staff at NLABS' Experimental Kitchens branch were requested to revise the current recipes, as needed, to prepare a number of new recipes utilizing newly authorized items, and to provide more recipe variations to existing recipes. This report covers the work of the staff members at the Experimental Kitchen in developing and testing recipes for the revised menu. The final 10-day menu and the alternate menu items are shown in Table 1.

¹SB10-495 Standard B Ration for the Armed Forces. Departments of the Army, the Navy and the Air Force, May 1971.

²Federal Supply Catalogue C8900-SL, 1983.

Table 1. Ten-Day Menu

Day 1

Breakfast	Lunch	Dinner
Grapefruit Sections Hot Oatmeal (D-6) w/Milk *Creamed Ground Beef (G-17) Bread Margarine Grape Jelly Peanut Butter Coffee (A-2) Cocoa	Chicken Noodle Soup (1-2) w/Crackers Luncheon Meat Sandwich (G-38) Mustard Baked Beans (J-1) Dill Pickles *Apple Crisp (C-15) Coffee (A-2) Tea Cherry Beverage (A-1)	Beef and Gravy (G-3) Mashed Potatoes (J-19) *Buttered Peas (J-15) Biscuits (B-2) Margarine Peach Jam Pears Peanut Butter Cookies (C-7) Coffee (A-2) Tea Lemonade Beverage (A-1)
Alternate Menu Items	Alternate Menu Items	Alternate Menu Items
*Creamed Ground Beef (G-17) (Using Canned Hamburgers)	*Apple Crisp (C-15) (Using Canned Prepared Apple Pie Filling)	*Buttered Peas (J-15) (Using Dehydrated Compressed Peas)

Day 2

Breakfast	Lunch	Dinner
*Orange Juice (F-3) Cheese Omelet (E-2) Bacon (G-1) Bread Margarine Strawberry Jam Peanut Butter Coffee (A-2) Cocoa	Tomato Vegetable Noodle Soup (1-5) w/Crackers *Grilled Hamburgers with Fried Onions (G-1B) Catsup Mustard **Hashed Brown Potatoes (J-17) Buttered Corn (J-12) Bread Dill Pickles Margarine Chocolate Pudding (C-16) Coffee (A-2) Tea Grape Beverage (A-1)	*Creole Chicken (G-25) Steamed Rice (D-4) **Buttered Green Beans (J-2a) ***Cabbage and Green Pepper Salad (H-1) Bread Margarine Pineapple Oatmeal Cookies (C-6) Coffee (A-2) Tea Fruit Punch Beverage (A-1)

*, **, ***Denotes alternate recipe and ingredient use. Number of stars identifies the item.

NOTE: The letter-number in parentheses indicates B Ration recipe number.

Table 1. Ten-Day Menu (cont'd)

Day 2 (cont'd)

Alternate Menu Items	Alternate Menu Items	Alternate Menu Items
*Orange Juica (Using Canned Orange Juice)	*Baked Hamburgers (G-20) (Using Canned Hamburgers) **Hashed Brown Potatoes (J-17) (Using Potatoes, White, Dehydrated, Diced)	*Creola Chicken (G-25) (Using Canned Chicken) **Buttered Green Beans (J-2) (Using Canned Green Beans) ***Cabbage and Green Pepper Salad (H-1) (Using Dehydrated Compressed Cabbage)

Day 3

Breakfast	Lunch	Dinner
*Grapefruit and Orange Juice (F-3) Hot Hominy Grits (D-6) Griddle Cakes (B-5) with Hot Maple Syrup Bacon (G-1) Bread Margarine Blackberry Jelly Peanut Butter Coffee (A-2) Cocoa	*Chili Macaroni (G-29) **Buttered Peas (J-15) Peach & Cottage Cheese Salad (H-4) Corn Bread (B-3) Margarine Fruit Cocktail Pudding (C-17) Sugar Cookies (C-8) Coffee (A-2) Tea Cherry Beverage (A-1)	Beef Noodle Soup (I-1) w/Crackers *Scalloped Ham and Potatoes (G-33) **Vegetable Medley (J-24) Bread Margarine Devils Food Cake (C-1) w/Vanilla Icing (C-3) Coffee (A-2) Tea Orange Beverage (A-1)
Alternate Menu Items	Alternate Menu Items	Alternate Menu Items
*Grapefruit and Orange Juice (Using Canned Grapefruit Juice and Orange Juice)	*Chili Macaroni (G-28) (Using Chili con Carne Dehydrated w/Beans) **Buttered Peas (G-15) (Using Dehydrated Compressed Peas)	*Scalloped Ham and Potatoes (G-33) (Using Potatoes, White, Dehydrated, Diced) **Vegetable Medley (J-24) (Using Dehydrated Compressed Mixed Vegetables)

Table 1. Ten-Day Menu (cont'd)

Day 4

Breakfast	Lunch	Dinner
<ul style="list-style-type: none"> *Orange Juice (F-3) Hot Oatmeal (D-6) w/Milk ** Creamed Ground Beef (G-17) Bread Margarine Peach Jam Peanut Butter Coffee (A-2) Cocoa 	<ul style="list-style-type: none"> Tomato Vegetable Noodle Soup (I-5) w/Crackers Baked Luncheon Meat with Pineapple Sauce (G-36) *Potatoes Au Gratin (J-20) ** Buttered Green Beans (J-2a) Dill Pickles Bread Margarine *** Applesauce (F-2) Butterscotch Brownies (C-4) Coffee (A-2) Tea Lemonade Beverage (A-1) 	<ul style="list-style-type: none"> * Beef and Gravy with Vegetables (G-5) Mashed Potatoes (J-19) Corn Relish (J-13) Biscuits (B-2) Strawberry Jam Margarine Cranberry Crunch (C-18) Coffee (A-2) Tea Grape Beverage (A-1)
Alternate Menu Items	Alternate Menu Items	Alternate Menu Items
<ul style="list-style-type: none"> * Orange Juice (Using Canned Orange Juice) ** Creamed Ground Beef (G-17) (Using Canned Hamburgers) 	<ul style="list-style-type: none"> * Potatoes Au Gratin (J-20) (Using Potatoes, White, Dehydrated, Diced) ** Buttered Green Beans (J-2) (Using Canned Green Beans) *** Applesauce (Using Canned Applesauce) 	<ul style="list-style-type: none"> * Beef and Gravy with Vegetables (G-6) (Using Canned Beef Chunks w/Natural Juices and Dehydrated Compressed Peas)

Day 5

Breakfast	Lunch	Dinner
<ul style="list-style-type: none"> Tomato Juice (F-4) Hot Hominy Grits (D-6) Scrambled Eggs Western Style (E-1) Bread Margarine Peanut Butter Grape Jelly Coffee (A-2) Cocoa 	<ul style="list-style-type: none"> Chicken Noodle Soup (I-2) w/Crackers *Chiliburgers (G-16) **Hashed Brown Potatoes (J-17) *** Cabbage & Green Pepper Salad (H-1) Bread Margarine Vanilla Pudding (C-16) Chocolate Cookies (C-5) Coffee (A-2) Tea Fruit Punch Beverage (A-1) 	<ul style="list-style-type: none"> Shrimp Creole (G-44) Steamed Rice (D-4) * Buttered Carrots and Peas (J-11) Bread Margarine ** Apple Crisp Coffee (A-2) Tea Cherry Beverage (A-1)

Table 1. Ten-Day Menu (cont'd)

Day 5 (cont'd)

Alternate Menu Items	Alternate Menu Items
*Chiliburgers (Using Canned Hamburgers and Chili con Carne Dehydrated w/Beans)	* Buttered Carrots and Peas (J-11) (Using Dehydrated Compressed Peas)
**Hashed Brown Potatoes (Using Potatoes, White, Dehydrated, Diced)	** Apple Crisp (C-15) (Using Canned Prepared Apple Pie Filling)
***Cabbage and Green Pepper Salad (H-1) (Using Dehydrated Compressed Cabbage)	

Day 6

Breakfast	Lunch	Dinner
* Grapefruit and Orange Juice (F-3) ** Roast Beef Hash (G-8) Catsup Cheese Omelet (E-2) Bread Margarine Peanut Butter Strawberry Jam Coffee (A-2) Cocoa	*Chicken Pot Pie (G-22) Cranberry Sauce Mashed Potatoes (J-19) Buttered Corn (J-12) Bread Margarine Yellow Cake (C-1) with Chocolate Icing (C-2) Coffee (A-2) Tea Orange Beverage (A-1)	Onion Soup (I-3) w/Crackers Baked Ham Macaroni and Tomatoes (G-30) * Buttered Green Beans (J-2a) Bread Margarine Cherry Cobbler (C-10) Coffee (A-2) Tea Lemonade Beverage (A-1)
Alternate Menu Items	Alternate Menu Items	Alternate Menu Items
*Grapefruit and Orange Juice (Using Canned Grapefruit Juice and Orange Juice) **Roast Beef Hash (G-8) (Using Potatoes, White, Dehydrated, Diced)	* Chicken Pot Pie w/Biscuit Topping (G-22) (Using Canned Chicken and Biscuit Mix and Potatoes, White, Dehydrated, Diced)	* Buttered Green Beans (J-2) (Using Canned Green Beans)

Table 1. Ten-Day Menu (cont'd)

Day 7

Breakfast	Lunch	Dinner
*Orange Juice (F-3) Hot Oatmeal (D-6) w/Milk Scrambled Eggs (E-1) Grilled Luncheon Meat (G-37) Quick Coffee Cake (B-6) Margarine Grape Jelly Peanut Butter Coffee (A-2) Cocoa	Beef Noodle Soup (I-1) w/Crackers Barbecued Beef (Sloppy Joe) (G-2) * Buttered Peas (J-15) ** Cabbage and Carrot Salad w/Cooked Salad Dressing (H-1) Bread Margarine Chocolate Brownies (C-4) w/Chocolate Icing (C-2) Pineapple Coffee (A-2) Tea Fruit Punch Beverage (A-1)	* Breaded Pork Chops and Cream Gravy (G-41) ** Applesauce (F-1) Mashed Potatoes (J-19) *** Buttered Succotash (J-22) Bread Margarine Peaches Raisin Oatmeal Cookies (C-6) Coffee (A-2) Tea Cherry Beverage (A-1)
Alternate Menu Items	Alternate Menu Items	Alternate Menu Items
*Orange Juice (Using Canned Orange Juice)	* Buttered Peas (J-15) (Using Peas Dehydrated Compressed) ** Cabbage and Carrot Salad (H-1) Using Cabbage Dehydrated Compressed)	* Hot Ham Chunks (Using Canned Ham Chunks) ** Applesauce (Using Canned Applesauce) *** Vegetable Medley (J-24) (Using Mixed Vegetables Dehydrated Compressed)

Day 8

Breakfast	Lunch	Dinner
Grapefruit Sections Hot Hominy Grits (D-6) French Toast (B-4) w/Hot Maple Syrup Bacon (G-1) Bread Margarine Peanut Butter Blackberry Jelly Coffee (A-2) Cocoa	* Beef Steak and Gravy (G-9) Mashed Potatoes (J-19) Stewed Tomatoes (J-23) Dill Pickles Bread Margarine ** Peach Cobbler (C-11) Coffee (A-2) Tea Orange Beverage (A-1)	Chicken Noodle Soup (I-2) w/Crackers * Chili con Carne (G-26) Steamed Rice (D-4) ** Buttered Green Beans (J-2a) Corn Bread (B-3) Margarine Pears Chocolate Cookies (C-5) Coffee (A-2) Tea Grape Beverage (A-1)

Table 1. Ten-Day Menu (cont'd)

Day 8 (cont'd)

Alternate Menu
Items

- * Beef Steak and Gravy (G-3)
(Using Canned Beef Chunks)
- ** Peach Cobbler (C-11)
(Using Canned Prepared
Peach Pie Filling)

Alternate Menu
Items

- * Chili con Carne (G-27)
(Using Canned Chili con Carne
without Beans and Canned
Kidney Beans)
- ** Buttered Green Beans (J)2a)
(Using Canned Green Beans)

Day 9

Breakfast

- * Grapefruit and Orange
Juice (F-3)
- Hot Oatmeal (D-6) w/milk
- Scrambled Eggs with
Bacon (E-1)
- Bread
- Margarine
- Peanut Butter
- Strawberry Jam
- Coffee (A-2)
- Cocoa

Lunch

- * Beef Patties Jardiniere (G-14)
- Mashed Potatoes (J-19)
- Buttered Corn (J-12)
- Pineapple & Cottage Cheese
Salad (H-2)
- Bread
- Margarine
- Marble Cake (C-1) with
Chocolate Icing (C-2)
- Coffee (A-2)
- Tea
- Lemon Beverage (A-1)

Dinner

- Tomato Vegetable Noodle
Soup (I-5) w/Crackers
- * Fried Fish Squares (G-46)
- Catsup
- Macaroni and Cheese (D-2)
- ** Buttered Peas (J-15)
- Bread
- Margarine
- Peaches
- Sugar Cookies (C-8)
- Coffee (A-2)
- Tea
- Fruit Punch Beverage (A-1)

Alternate Menu
Items

- * Grapefruit and Orange
Juice
(Using Grapefruit Juice
Canned and Orange Juice)

Alternate Menu
Items

- * Beef Patties Jardiniere (G-15)
(Using Canned Hamburgers
and Dehydrated Compressed
Peas)

Alternate Menu
Items

- * Tuna Loaf (G-48)
(Using Canned Tuna)
- ** Buttered Peas (J-15)
(Using Dehydrated Compressed
Peas)

Table 1. Ten-Day Menu (cont'd)

Day 10

Breakfast	Lunch	Dinner
<ul style="list-style-type: none"> *Orange Juice (F-3) Hot Hominy Grits (D-6) **Roast Beef Hash (G-8) Catsup Bread Margarine Peanut Butter Peach Jam Coffee (A-2) Cocoa 	<ul style="list-style-type: none"> *Baked Chicken and Rice (G-21) Cranberry Sauce **Buttered Green Beans (J-2a) Biscuits (B-2) Margarine Chocolata Brownies (C-4) w/Chocolata Icing (C-2) Fruit Cocktail Coffee (A-2) Tea Orange Beverage (A-1) 	<ul style="list-style-type: none"> Onion Soup (I-3) w/Crackers *Baked Pork Chops in Tomato Sauce (G-39) Mashed Potatoes (J-19) **Bavarian Cabbage (J-7) Dill Pickles Bread Margarine Cherry Crunch (C-18) Coffee (A-2) Tea Grape Beverage (A-1)
Alternate Menu Items	Alternate Menu Items	Alternate Menu Items
<ul style="list-style-type: none"> *Orange Juice (Using Canned Orange Juice) **Roast Beef Hash (G-8) (Using Potatoes, White, Dehydrated, Diced) 	<ul style="list-style-type: none"> *Baked Chicken and Rice (G-21) (Using Canned Chicken) **Buttered Green Beans (J-2) (Using Canned Green Beans) 	<ul style="list-style-type: none"> * Hot Ham Chunks (Using Canned Ham Chunks) ** Bavarian Cabbage (J-7) (Using Dehydrated Compressed) Cabbage)

B RATION RECIPE DEVELOPMENT

There are 100 recipes and 31 variations in the 1971 version of the B Ration. The 1983 revision has an additional 28 new recipes, plus 11 variations. Five variations were added to already existing recipes (see Table 2). All of the recipes in the 1971 Revision were reviewed for accuracy and yield, and for any changes required if packaging of ingredients had changed since 1971. The revision contains 120 recipes with 38 variations for a total of 158 recipes.

Recipes are modeled after those in the Armed Forces Recipe Service Recipes,³ which are utilized by all the military services. The AFRS recipes as revised in May 1980 contain a number of new recipes utilizing B Ration components to enable military cooks to rotate stocks of certain ingredients. Each month the Master Menu⁴ used by the Army designates several ingredients from the B Ration to be used in dining hall feeding as an aid in rotating overage stocks. The new recipes added to the 1980 revision of the AFRS were developed for this purpose.

There is a Standard and an Alternate menu for the B Ration. The Alternate menu utilizes canned meats, dehydrated compressed vegetables, canned juices and prepared pie fillings. Recipes to use these items were a part of the revision. The revised recipes and menus tested in this study have been incorporated into an undated draft menu of SB10-496 (see Table 1).

The May 1971 edition of SB10-496¹ includes recipes for brownies and other desserts made from scratch. However, because mixes for brownies, cookies and puddings are now available, the revised B Ration includes recipes using the mixes and deleting the more time-consuming recipes. There were nine recipes deleted from the present publication. Three of these were corned beef recipes and this item has been deleted from the ration because of procurement difficulties. Packaging and/or ingredient changes in either weight or measure accounted for 25 additional changes. Recipes were checked for simplicity of preparation instructions as the food is often prepared by inexperienced cooks.

Ingredients

There are 120 ingredients in the standard B Ration items, including those used in the Standard and Alternate menus (see Appendix A). Three dehydrated beef items and one each of dehydrated chicken and fish squares plus canned margarine and dehydrated, diced cabbage are authorized only for the B Ration. Procurement of these seven specialty items presents problems, inasmuch as the quantities required are not large. Twenty-five additional ingredients are authorized solely for use overseas, afloat, or in therapeutic feeding (see Appendix B). The remaining 88 ingredients are authorized for normal troop subsistence.

³Armed Forces Recipe Service. US Army TM10-410, NAVSUP Publication 7, United States Air Force AFM 146-12-Vol II. United States Marine Corps MCO P10110.16C, May 1980.

⁴U.S. Army SB10-260 MASTER MENU for (month).

Table 2. New Recipes Added to Revision of B Ration, 1983

Fruit Flavored Beverage	Fruit Cocktail Pudding	Creamed Ground Beef	Shrimp Creole
Brownies (Mix)	Cranberry Crunch	Baked Ham, Macaroni and Tomatoes	Beef Noodle Soup
Chocolate Cookies (Mix)	Rice Pilaf	Baked Luncheon Meat w/Pineapple Sauce	Baked Beans
Peanut Butter Cookies (Mix)	Roast Beef Hash	Beef Steak in Tomato Sauce	Corn Relish
Sugar Cookies (Mix)	Beef Steak w/Fried Onions	Scalloped Luncheon Meat and Potatoes	Vegetable Medley
Pudding, Chocolate and Vanilla (Mix)	Quick Coffee Cake	Pineapple w/Cottage Cheese Salad	Buttered Green Beans (Dehydrated, Compressed)
	Chiliburgers		Savory Green Beans (Dehydrated, Compressed)
	Salmon Loaf		
	Tuna Loaf		
Variations Added to New Recipes		Variations Added to Existing Recipes	
Raisin Oatmeal Cookies	Rice Pilaf (Dehy. Onion Soup)	Hominy Grits	
Raisin Sugar Cookies	Orange Rice	Fish with Cornbread Coating	
Chocolate Roll Cookies	Cherry Crunch	Hush Puppies	
Peanut Butter Bars	Peach w/Cottage Cheese Salad	Oatmeal Bars	
Sugar Cookie Roll	Creamed Ground beef (Canned Hamburgers)	Lyonnaisse Rice	
Sugar Cookie Bars			

Cooking Equipment

In recipe testing, only designated field equipment was used. The source of heat for cooking and baking is the M-1950 Field Range (see Figure 1). Food was prepared using pots and baking pans specified for use with the field range. This field range has been adapted for use in the Experimental Kitchens. In the field, gasoline or diesel fuel is provided for cooking and baking. For indoor use, natural gas is the fuel. According to the experiences of military cooks attached to the Experimental Kitchens, the heat generated by natural gas differs in intensity from that given by gasoline or diesel fuel. When an opportunity came to field-test the menus, this variation was an important consideration.

Water Requirements

An area of prime interest of military strategists is the amount of water troops need in the field. The quantity needed for ration preparation will have an impact, particularly in the desert and arctic operations. The amount of water needed to prepare 100 servings of the Standard and the Alternate menu was calculated and is given in Table 3.

The water needed varied for each meal from a low of 19 gallons to prepare the Lunch on the Alternate menu on Day 1 to a high of 38 gallons for the Lunch on the Standard Menu for Day 5.

Dehydrated, compressed vegetables require from three to four and a half gallons of water for rehydration. The amounts vary according to the vegetable and the quantity used. In the Standard menu, dehydrated compressed green beans are used five times. Three and one-half gallons of water are needed for each 100 servings. Dehydrated cabbage is used once as a vegetable and three times in a salad. The other vegetables (corn, peas, and carrots) are canned items, with the exception of green peppers and chopped onions, which are recipe ingredients widely used in both the Standard and Alternate menus. In the Alternate menu, dehydrated compressed vegetables replace canned vegetables with the exception of the canned green beans item, which is given as the "Alternate" item for dehydrated green beans. The use of canned for dehydrated vegetables in all menus would be a means of water conservation.

Dehydrated meats, chicken and fish require water for rehydration. The amount varies from three to six gallons according to the product. If the residual water from rehydration is utilized for gravy preparation it is not lost, but water used in rehydrating fish squares and shrimp is unacceptable for this purpose. A further discussion of water requirements and water conservation will be the subject of a subsequent paper.

FIELD TESTING THE MENU

Objectives

At the time the recipe development was completed, NLABS developers recognized that a small-scale field test would provide valuable data. The developers had six objectives in field testing the menu.

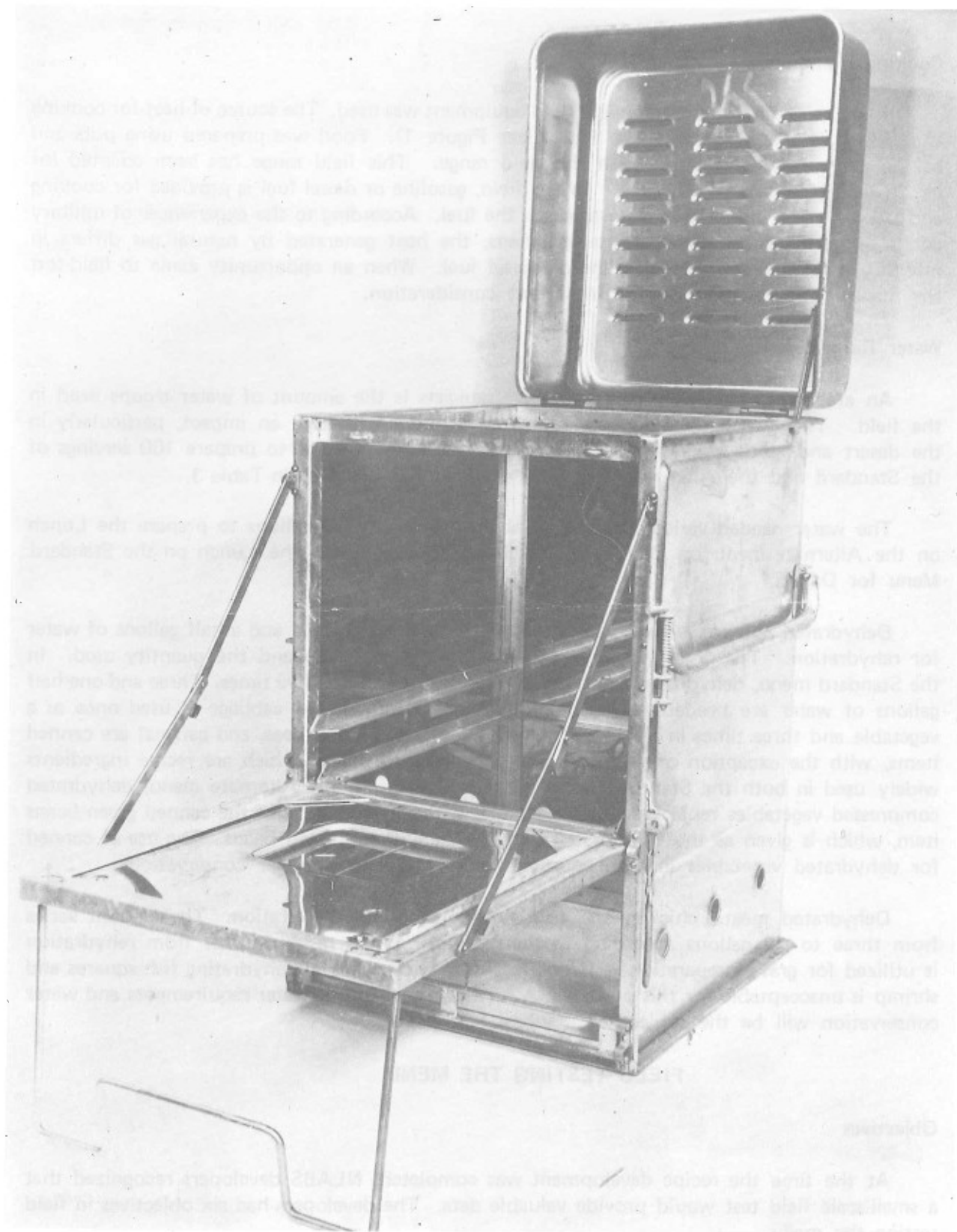


Figure 1. Gasoline Field Range, M — 1959

**Table 3. Water Requirements Per Meal for the Standard B Ration 10-Day Cycle Menu*
(100 Servings)**

	Day 1		Day 2		Day 3		Day 4		Day 5	
	Reg	Alt	Reg	Alt	Reg	Alt	Reg	Alt	Reg	Alt
Breakfast, Gals.	26	23**	19	14**	24	19	31	23**	23	23
Lunch, Gals.	20	18**	34	28**	22	25**	32	26**	38	32**
Dinner, Gals.	18	22**	26	19**	24	29**	23	18**	21	21
Total	64	63	79	61	70	73	86	67	82	76

	Day 6		Day 7		Day 8		Day 9		Day 10	
	Reg	Alt	Reg	Alt	Reg	Alt	Reg	Alt	Reg	Alt
Breakfast, Gals.	26	22**	27	22**	17	17	23	18**	31	27**
Lunch, Gals.	23	20**	25	29**	21	17**	21	20**	23	18**
Dinner, Gals.	28	25	22	20**	31	23**	28	29**	32	26**
Total	77	67	74	71	69	57	72	67	86	71

Total Gallons, Regular Menu Items 759
Total Gallons, Using Alternate Menu Items 673
Total Gallon Difference 86

* Includes 34.5 gallons of water per day for meal beverages (11.3 gallons for breakfast and 11.6 gallons each for lunch and dinner meals).

** Use of alternate items.

NOTE: Gallons are rounded.

1. To review food preparation instructions for the existing recipes and to make improvements as needed;
2. To check individual recipes for equipment needed, preparation time, yield and acceptance;
3. To determine degree of acceptance of the menus as compiled;
4. To determine water requirements for field preparation under actual preparation conditions;
5. To determine if a complete meal for 100 soldiers could be prepared in the two to three hours available between meals;
6. To determine if the recipe instructions were easy to follow and comprehensible to an inexperienced cook.

There was no information available on any prior testing of the menus. In the 10-day menu, breakfast items are somewhat repetitive, so two breakfasts were selected as representative for testing with the 10-day lunch and dinner menus.

Methods

For the planned test a prototype Mobile Field Kitchen Trailer was used. This trailer allowed testing to be done even in inclement weather because the sides could be lowered in the event of rain or snow. Only the burner units and serving tables, which would be standard in a regular field kitchen, were used. Food was prepared by the two military cooks, one an experienced Sergeant, and one a Private First Class. The NLABS Experimental Kitchen personnel, usually three or four persons, served the meal and collected the required data. Efforts were made to utilize as many military personnel as possible as volunteer tasters. When these were unavailable, other tasters were drawn from the civilians employed at NLABS, primarily home economists, food technologists and other personnel assigned to the Food Technology Division of the Food Engineering Laboratory of NLABS.

The clean-up of soiled pots and pans was done in the Experimental Kitchens facilities as a sanitation tent was not provided. Disposable trays, cups, and cutlery were used.

Findings

1. Complaints of saltiness: There were complaints that recipes made with canned beef with juices were too salty. The recipe was retested and the soup and gravy base ingredient was removed. Only one half of the drained meat juices from the cans was used. These changes improved the product.
2. Time-consuming preparation of cookies: The time to pan and bake cookies proved a most time-consuming operation. As a result, the cookies recipes were retested and the water

was decreased, which produced an acceptable bar cookie. This decrease was done for all cookie recipes, which added additional variations to the cookie recipes. This change will save time for field cooks.

3. **Rehydration time affected by water temperature:** When dehydrated beef patties were rehydrated on an extremely cold day, the water cooled rapidly. As a result, the patties did not completely rehydrate and were extremely tough. If rehydration is done in an unprotected environment, the pans should be covered to maintain the lukewarm water temperature.

4. **Recycling of water in canned ham chunk recipes:** Several recipes in the revised menus use ham chunks in combination with potatoes or macaroni. Canned ham chunks are immersed in hot water for 20 minutes before being used in recipe preparation to melt the fat and allow easy removal of the chunks of ham from the can. Two gallons of hot water are used to cover the unopened cans. If the starches are cooked as a first step in the recipe, the drained water from the cooked products can be used to cover the unopened cans of ham. This recycling saves water. A change in the preparation directions is suggested on the recipes for the revised B Ration.

5. **Extremely tough dehydrated meat products:** Consumer comments and the observations of the Home Economist conducting the test indicate that the textures of the dehydrated meats received for the test were marginal. In six menus, (L-2, L-3, D-4, D-5, D-7, L-9) the ratings were affected by the quality of the dehydrated meats. While the ratings of the products after preparation were not unusually low, the comments indicated less than satisfaction with the dehydrated meats. The comments are given in Appendix C. Since this testing, NLABS food technologists have developed flaked and formed dehydrated meats, which are far superior to the regular dehydrated beef and pork products. If this method of preparation is approved, it would be a "giant step" forward in improving dehydrated meat products used in the B Ration.

6. **Frosting mixes too firm in extremely cold weather:** On another cold day, the frosting for cakes became almost too firm to spread. The frosting is prepared with hot water for ease in spreading. The only way to prevent such firming is to recommend that in cold weather cakes be covered immediately after frosting.

7. **Times for meal preparation vary:** Entrees that require breading and/or frying are time consuming. For example, in Dinner 7 there are pork chops to be rehydrated, breaded and browned, and cookies to be prepared (see Table 1). Both cooks' time was fully utilized. If more than two cooks are working, this problem does not exist. When cookies are on the menu, it would shorten the time if they could be prepared between meals. Recipes using canned meat products take less preparation time than dehydrated. If time is limited, canned meat recipes should be used.

8. **Recycled water from rehydration of meats in gravy preparation:** All of the water used in rehydrating dehydrated meat is not taken up by the meat tissues. Residual water can be used in the gravy. This recycling is also possible for chicken, and recipe procedures were changed to reflect this fact. This revision is one more way to conserve water.

The comments of the home economist observing the meal preparation are found in the Appendix C.

Acceptance Scale

The finished meals were served to a panel of volunteers drawn from the military and civilian population of NLABS. After consuming a meal, panelists were asked to rate two menu items from each meal and to rate the entire menu as a whole. A nine-point hedonic scale was used in rating. A sample of the rating sheet is given in the Appendix D. Panelists were asked to make pertinent comments on the rating sheets.

RESULTS AND DISCUSSION

The ratings given by the panelists are shown in the Table 4. Although 100 servings of each menu were prepared, only 32 to 62 persons were involved in testing on varying days. The numbers of testers for each item and the total meal are indicated.

Conducting a field test of the 10-day menu provided the answers to the questions posed in the objectives. The recipes were easy to prepare, but in some instances improvements in methods were made and the results incorporated into the finished recipes.

The yields of the finished products were satisfactory and the equipment provided was sufficient to produce each day's menu.

The food and menu were found to be acceptable to the panel. More civilians than military rated the menus, but Peryam and Haynes⁵ found that soldiers' food preferences are the same as those of the civilian population.

The two military cooks were able to prepare 100 servings of each menu in the two to three-hour time frame, and the less experienced cook had no difficulty in following the recipe preparation instructions.

The test did pinpoint problems with dehydrated beef and pork items. No food preparation expertise can improve products not meeting specification requirements as to the quality of raw ingredients, or to the slicing and dicing of the product. Quality control should make a high priority of assuring that the field cook when far from a source of resupply receives acceptable ingredients. The test pinpointed a need for further work in improving dehydrated meats. Work on this area is now ongoing at NLABS.

The B Ration is not widely used in peacetime, but should war erupt, a highly acceptable B Ration would be needed.

CONCLUSION

When the revised B Ration is published, it will provide troops in the field a highly acceptable, nutritionally adequate ration.

⁵ D.J. Peryam and J.A. Haynes. Prediction of Soldier's Food Preferences by Laboratory Methods. Journal of Applied Psychology, 41, 2, 1957.

Table 4. Ratings of Selected Items and Each Menu as a Whole of 10-Day B Ration Menu Cycle

Day	Menu	Items Rated	Ratings	No. Testers
1	Lunch	Baked Beans*	7.6	32
		Apple Crisp**	7.1	32
		Menu as a Whole	7.2	31
	Dinner	Beef w/Gravy	7.6	55
		Peanut Butter Cookies	7.9	52
		Menu as a Whole	7.9	52
2	Lunch	Hamburgers w/Onions	6.6	38
		Hash Brown Potatoes	***	***
		Menu as a Whole	6.4	38
	Dinner	Chicken Creole**	6.8	39
		Cabbage and Green Pepper Salad	5.2	39
		Menu as a Whole	7.2	38
3	Breakfast	Orange—Grapefruit Juice	7.3	44
		Pancakes	8.0	48
		Menu as a Whole	7.6	46
	Lunch	Chili Macaroni	7.0	56
		Fruit Cocktail Pudding	7.9	56
		Menu as a Whole	7.0	54
	Dinner	Scalloped Ham and Potatoes	7.8	50
		Devils Food Cake/Vanilla icing	7.8	49
		Menu as a Whole	7.7	48

*New recipe
 **Revised recipe
 ***Not tested

Table 4. Ratings of Selected Items and Each Menu as
a Whole of 10-Day B Ration Menu Cycle (cont'd)

Day	Menu	Items Rated	Ratings	No. Tasters
4	Breakfast	Oatmeal	7.1	44
		Creamed Ground Beef*	7.2	44
		Menu as a Whole	6.7	44
	Lunch	Grilled Luncheon Meat	6.6	51
		Potatoes au Gratin	6.0	51
		Menu as a Whole	6.8	51
	Dinner	Beef and Gravy	6.5	37
		Corn Relish*	7.1	37
		Menu as a Whole	7.1	33
5	Lunch	Chiliburgers*	6.4	46
		Vanilla Pudding*	7.5	46
		Menu as a Whole	6.8	42
	Dinner	Shrimp Creole*	8.0	48
		Apple Crisp**	8.1	48
		Menu as a Whole	7.7	48
6	Breakfast	Roast Beef Hash*	7.5	50
		Cheese Omelet	6.0	50
		Menu as a Whole	7.0	40
	Lunch	Chicken Pot Pie	7.7	42
		Yellow Cake/Choc. Icing	7.7	42
		Menu as a Whole	7.8	40
	Dinner	Ham, Macaroni and Tomato*	7.5	53
		Cherry Cobbler	7.7	53
		Menu as a Whole	7.5	50

Table 4. Ratings of Selected Items and Each Menu as a Whole of 10-Day B Ration Menu Cycle (cont'd)

Day	Menu	Items Rated	Ratings	No. Testers
7	Lunch	Barbecue Beef**	7.7	62
		Chocolate Brownies*	7.3	62
		Menu as a Whole	7.5	61
	Dinner	Breaded Pork Chops	7.1	39
		Raisin Oatmeal Cookies*	7.9	37
		Menu as a Whole	7.5	38
8	Lunch	Beef Steak and Gravy	7.6	52
		Peach Cobbler	7.1	53
		Menu as a Whole	7.5	50
	Dinner	Chili con Carne	7.6	43
		Cornbread**	6.9	41
		Menu as a Whole	7.5	40
9	Lunch	Beef Patties Jardiniere**	6.7	46
		Marble Cake w/Choc. Icing	7.3	39
		Menu as a Whole	7.0	46
	Dinner	Macaroni and Cheese**	7.1	52
		Sugar Cookies*	7.6	50
		Menu as a Whole	7.7	50
10	Lunch	Chicken with Rice**	7.7	61
		Hot Biscuits	8.0	61
		Menu as a Whole	8.0	61
	Dinner	Pork Chops in Tomato Sauce*	6.7	51
		Bavarian Cabbage	6.1	51
		Menu as a Whole	7.1	48

This document reports research undertaken at the US Army Natick Research and Development Command and has been assigned No. NATICK/TR-84/208 in the series of reports approved for publication.

This document reports research undertaken at the US Army Natick Research and Development Command and has been assigned No. NATICK/TR-*841001* in the series of reports approved for publication.

APPENDIXES

- A. List of Standard B Ration Items**
- B. Restricted Use Items in B Ration**
- C. Comments of Home Economist**
- D. Sample B Ration Rating Sheet**

APPENDIX A

List of Standard B Ration Items

National Stock Number	Item Identification	Unit
1. 8915-00-584-1660	Apples, dehydrated OR	No. 10 can
1a. 8940-00-616-0226	Pie filling, prepared fruit apple, canned*	No. 10 can
2. 8915-00-655-5718	Applesauce, instant OR	No. 2-1/2 can
2a. 8915-00-127-8272	Applesauce, canned*	No. 10 can
3. 8905-01-086-0395	Bacon, precooked, sliced	No. 10 can
4. 8950-00-125-6333	Baking powder	1-lb can
5. 8915-00-616-4820	Beans, green, canned* AND	No. 10 can
5a. 8915-00-634-2436	Carrots, canned* AND	No. 10 can
5b. 8915-00-257-3947	Corn, canned, whole grain* OR	No. 10 can
5c. 8915-01-039-8808	Vegetables, mixed, dehydrated, compressed	No. 2-1/2 can
6. 8915-00-151-6566	Beans, green, dehydrated, compressed OR	No. 2-1/2 can
6a. 8915-00-616-4820	Beans, green, canned* Beans, kidney, canned*	No. 10 can (See Chili con Carne canned, w/o beans)
7. 8915-00-577-4526	Beans, lima, canned AND	No. 10 can
7a. 8915-00-257-3947	Corn, canned, whole grain OR	No. 10 can
7b. 8915-01-039-8808	Vegetables, mixed, dehydrated, compressed*	No. 2-1/2 can
8. 8915-00-184-5601	Beans, white, canned, in tomato sauce w/pork	No. 10 can
9. 8905-00-926-6196	Beef chunks w/natural juices, canned	29-oz can
10. 8905-00-965-1681	Beef, diced, dehydrated, uncooked OR	No. 10 can
10a. 8905-00-926-6196	Beef chunks w/natural juices, canned*	29-oz can
11. 8905-00-823-7559	Beef, patties, dehydrated, uncooked OR	No. 10 can
11a. 8905-00-143-0969	Hamburgers without gravy, canned*	12-oz can
12. 8905-00-753-6536	Beefsteak, dehydrated, uncooked OR	No. 10 can
12a. 8905-00-926-6196	Beef chunks w/natural juices, canned*	29-oz can
13. 8960-00-965-4764	Beverage base, cherry	5-gal yield pg

*Used in alternate menu

APPENDIX A (cont'd)

National Stock Number	Item Identification	Unit
14. 8960-01-069-6661	Beverage base, fruit punch	5-gal yield pg
15. 8960-00-965-4765	Beverage base, grape	5-gal yield pg
16. 8960-01-069-6662	Beverage base, lemonade	5-gal yield pg
17. 8960-00-965-4768	Beverage base, orange	5-gal yield pg
18. 8920-00-926-6016	Biscuit mix	No. 10 can
19. 8920-00-935-3263	Brownie mix, butterscotch	No. 10 can
20. 8920-00-935-3262	Brownie mix, chocolata	No. 10 can
21. 8915-00-656-1353	Cabbage, dehydrated, diced	No. 2-1/2 can
	OR	
21a. 8915-01-035-4116	Cabbage, dehydrated, diced, compressed discs*	No. 2-1/2 can
22. 8920-00-823-7221	Cake mix, devil's food	No. 10 can
23. 8920-00-823-7229	Cake mix, yellow	No. 10 can
24. 8915-00-634-2436	Carrots, canned	No. 10 can
24a. 8919-01-095-9308	Carrots, dehydrated, shredded, compressed	No. 2-1/2 can
25. 8950-00-127-9789	Catsup, tomato	No. 10 can
26. 8920-01-075-2710	Cereal, rolled oats	No. 2-1/2 can
27. 8920-01-079-1583	Cereal, wheat, farina	28-oz box
28. 8910-00-082-5734	Cheese, cottage, dehydrated	No. 10 can
29. 8910-00-823-6880	Cheese, American, processed, dehydrated	No. 10 can
30. 8905-00-112-8588	Chicken, dehydrated, cooked, diced	No. 10 can
	OR	
30a. 8905-00-753-6106	Chicken, canned, boned*	29-oz can
31. 8905-00-118-8588	Chicken, dehydrated, cooked, diced	No. 10 can
	OR	
31a. 8905-00-753-6106	Chicken, canned, boned*	29-oz can
	AND	
31b. 8920-00-926-6016	Biscuit mix*	No. 10 can
32. 8940-00-151-6462	Chili con carne, dehydrated, w/beans, cooked	No. 10 can
	OR	
32a. 8940-00-126-3394	Chili con carne, canned, w/o beans*	6-3/4 lb can
33. 8940-00-151-6462	Chili con carne, dehydrated, w/beans, cooked	No. 10 can
	OR	
33a. 8940-00-126-3394	Chili con carne, canned, w/o beans*	6-3/4 lb can
	AND	
33b. 8915-00-926-6793	Beans, kidney, canned*	No. 10 can
34. 8950-00-170-9573	Cinnamon, ground	3 to 4-oz can
35. 8960-00-218-6131	Cocoa beverage powder	1-oz pg
36. 8955-00-286-5372	Coffee, roasted	20-lb can
	OR	
36a. 8955-00-081-0862	Coffee, instant, freeze dried	8-oz pg
37. 8920-00-168-3296	Cookie mix, chocolate	No. 10 can
38. 8920-00-935-3264	Cookie mix, oatmeal	No. 10 can
39. 8920-00-175-0429	Cookie mix, sugar	No. 10 can
40. 8920-00-435-4918	Corn bread mix	No. 10 can

APPENDIX A (cont'd)

National Stock Number	Item Identification	Unit
41. 8915-00-257-3947	Corn, canned, whole grain	No. 10 can
42. 8920-00-252-3838	Crackers, soda, salted	1 or 2-lb box
43. 8915-00-851-6564	Cranberry sauce, canned, jellied or strained	No. 10 can
44. 8940-01-074-4922	Cream substitute, dry	100 3-gm pgs to box
45. 8940-00-131-8693	Dessert powder, pudding, instant, chocolate	No. 10 can
46. 8940-00-131-8761	Dessert powder, pudding, instant, vanilla	No. 10 can
47. 8910-00-965-1553	Egg mix, dehydrated	No. 3 cyl can
48. 8905-00-823-7095	Fish squares, dehydrated, uncooked	No. 10 can
	OR	
48a. 8905-00-935-3161	Fish, tuna, canned*	4-lb can
49. 8920-00-140-7749	Flour, wheat, general purpose	50-lb bag
50. 8920-00-165-6864	Flour, wheat, bread, flour	50-lb bag
	OR	
50a. 8920-00-165-6863	Flour, wheat, bread, flour	10-lb bag
51. 8915-00-286-5482	Fruit cocktail, canned	No. 10 can
52. 8915-00-149-1571	Garlic, dehydrated	12-oz jar
53. 8915-01-069-4969	Grapefruit, canned	No. 3 cyl can
54. 8905-00-023-8284	Ham, chunks with juices, canned	29-oz can
55. 8920-01-079-1585	Hominy grits	24-oz co
56. 8950-01-074-4918	Hot sauce	6-oz bottle
57. 8925-00-935-3260	Icing mix, chocolate	No. 10 can
58. 8925-00-935-3261	Icing mix, vanilla	No. 10 can
59. 8930-00-240-0055	Jam, peach	No. 2-1/2 can
60. 8930-00-559-8307	Jam, strawberry	No. 2-1/2 can
61. 8930-00-543-7608	Jelly, blackberry	No. 2-1/2 can
62. 8930-00-543-7607	Jelly, grape	No. 2-1/2 can
63. 8915-00-753-6430	Juice, grapefruit, instant	15-1/2 oz can
	OR	
63a. 8915-00-085-1650	Juice, grapefruit, canned*	No. 3 cyl can
64. 8915-00-530-3414	Juice, orange, instant	15-1/2 oz can
	OR	
64a. 8915-00-241-2800	Juice, orange, canned*	No. 3 cyl can
65. 8915-00-616-0204	Juice, tomato, canned, concentrated (3+1)	36-oz can
66. 8905-00-126-4020	Luncheon meat, canned	6-lb can
67. 8920-00-067-6146	Macaroni	10-lb box
68. 8945-00-222-0567	Margarine	No. 10 can
69. 8910-01-091-7209	Milk, nonfat, dry	4-lb can
70. 8910-00-584-6432	Milk, nonfat, dry	25-lb can
71. 8950-00-543-7698	Mustard, prepared	No. 2-1/2 can
72. 8915-00-128-1179	Onions, dehydrated, chopped	No. 10 can
	OR	
72a. 8915-00-151-6568	Onions, dehydrated, compressed	No. 2-1/2 can

APPENDIX A (cont'd)

National Stock Number	Item Identification	Unit
73. 8920-00-782-6353	Pancake mix	No. 10 can
74. 8915-00-577-4203	Peaches, canned, quarters or slices	No. 10 can
75. 8930-00-543-7602	Peanut butter	No. 2-1/2 can
76. 8915-00-616-0223	Pears, canned	No. 10 can
77. 8915-00-127-9282	Peas, canned	No. 10 can
	OR	
77a. 8915-00-401-8480	Peas, dehydrated, compressed cooked*	No. 2-1/2 can
78. 8950-00-127-8067	Pepper, black, ground	1-lb can
79. 8915-00-227-1387	Peppers, green, dehydrated, uncooked	No. 2-1/2 can
80. 8950-00-616-5469	Pickles, cucumber, dill, whole	No. 10 can
81. 8940-00-616-0227	Pie filling, prepared, fruit, cherry	No. 10 can
82. 8915-00-127-7262	Pineapple, canned, crushed	No. 10 can
83. 8915-00-170-5148	Pineapple, canned, slices	No. 10 can
84. 8905-00-935-6395	Pork chops, dehydrated, uncooked	No. 10 can
	OR	
84a. 8905-00-023-8284	Ham, canned, chunks*	20-oz can
85. 8915-01-087-0981	Potatoes, white, dehydrated, slices	5-gal co
85a. 8915-00-161-8912	Potatoes, white, dehydrated, diced	No. 10 can
86. 8915-00-164-6876	Potatoes, white, instant, granules	No. 10 can
87. 8915-00-286-5487	Raisins	No. 10 can
88. 8920-00-530-2185	Rice, parboiled	10-lb bag
89. 8950-01-079-6943	Salt, table	5-lb bag
90. 8945-01-066-8210	Shortening compound, general purpose	3-lb can
	OR	
90a. 8945-00-080-9396	Shortening compound, general purpose	5-gal can
91. 8905-00-753-6432	Shellfish, shrimp, dehydrated	No. 10 can
92. 8935-00-082-5588	Soup and gravy base, instant, beef flavored	200 7-gm pgs to box
93. 8935-00-149-1359	Soup, dehydrated, beef flavored w/noodles and vegetables	No. 2-1/2 can
94. 8935-00-753-6422	Soup, dehydrated, chicken flavored w/noodles	No. 2-1/2 can
95. 8935-00-222-0570	Soup, dehydrated, onion	No. 2-1/2 can
96. 8935-00-577-4680	Soup, dehydrated, tomato-vegetable, w/noodles	No. 2-1/2 can
97. 8935-00-234-6217	Soup and gravy base, instant, beef flavored	No. 2-1/2 can
98. 8935-00-543-7789	Soup and gravy base, instant, chicken flavored	No. 2-1/2 can
99. 8920-00-926-4917	Starch, pregelatinized	No. 10 can
100. 8925-01-059-4084	Sugar, refined, granulated	10-lb bag
101. 8925-00-682-6705	Syrup, imitation maple	No. 10 can
	OR	
101a. 8925-00-872-6708	Syrup, imitation maple	No. 2-1/2 can
102. 8955-00-753-6332	Tea, black, individual bags	100-bags to box
	OR	
102a. 8955-00-823-7016	Tea, instant	3/4-oz pg
103. 8915-00-582-4060	Tomatoes, canned	No. 10 can
104. 8950-00-577-5990	Vinegar, dry, synthetic	4-oz pkg
105. 8950-01-059-5269	Worcestershire sauce	5, 6 or 10-fl oz bot
106. 8950-00-161-0802	Yeast, baker's, active dry	2-lb can

APPENDIX B

Restricted Use Items in B Ration

Items for B Ration use only

1.	8905-00-965-1681	Beef, diced, dehydrated, uncooked	No. 10 can
2.	8905-00-823-7559	Beef patties, dehydrated, uncooked	No. 10 can
3.	8905-00-753-8536	Beefsteak, dehydrated, uncooked	No. 10 can
4.	8905-00-118-8588	Chicken, dehydrated, cooked, diced	No. 10 can
5.	8905-00-823-7095	Fish squares, dehydrated, uncooked	No. 10 can
6.	8945-00-222-0567	Margarine	No. 10 can
7.	8915-01-035-4116	Cabbage, dehydrated, diced	No. 2-1/2 can

Items for overseas B Ration or Afloat use only

1.	8905-01-086-0395	Bacon, precooked, sliced	No. 10 can
2.	8915-00-151-8566	Beans, green, dehydrated, compressed discs	No. 2-1/2 can
3.	8905-00-926-6196	Beef chunks with juices	29-oz can
10.	8905-00-143-0969	Hamburgers without gravy, cooked	12-oz can
4.	8915-01-035-4116	Cabbage, dehydrated, diced, compressed discs	No. 2-1/2 can
11.	8930-00-240-0055	Jam, peach	No. 2-1/2 can
12.	8930-00-559-8307	Jam, strawberry	No. 2-1/2 can
13.	8930-00-543-7608	Jelly, blackberry	No. 2-1/2 can
14.	8930-00-543-7607	Jelly, grape	No. 2-1/2 can
15.	8905-00-126-4020	Luncheon meat	6-lb can
16.	8915-00-151-8568	Onions, dehydrated, compressed discs	No. 2-1/2 can
17.	8930-00-543-7602	Peanut Butter	No. 2-1/2 can
18.	8915-00-401-8480	Peas, dehydrated, compressed cooked	No. 2-1/2 can
19.	8950-00-616-5469	Pickles, cucumber dill, whole	No. 10 can
20.	8905-00-935-6395	Pork chops, dehydrated, uncooked	No. 10 can
21.	8915-00-164-6876	Potatoes, white, instant granules	No. 10 can
22.	8905-00-753-6432	Shellfish, shrimp, dehydrated	No. 10 can
23.	8945-01-066-8210	Shortening compound, general purpose	5 gal can
6.	8905-00-753-6106	Chicken canned, boned	29-oz can
7.	8940-00-151-6462	Chili con carne, dehydrated w/beans cooked	No. 10 can
5.	8920-01-075-2710	Cereal, rolled oats	No. 2-1/2 can
8.	8910-00-082-5734	Cottage cheese, dehydrated	No. 10 can
24.	8915-01-039-8808	Vegetables, mixed, dehydrated, compressed discs	No. 2-1/2 can
25.	8950-00-577-5990	Vinegar, dry, synthetic	4-oz pkg
9.	8905-00-023-8284	Ham chunks with juices	29-oz can

APPENDIX C

Comments of Home Economist

Day 1 - Dinner

Beef with Gravy: After the first recipe was prepared with canned beef chunks plus soup and gravy base, the recipe was revised to delete soup and gravy base and to use only half of the liquid drained from the meat in the gravy. The resulting product was judged less salty.

Biscuits: It was difficult to brown biscuits on top of meat. The time of cooking was extended one half hour, but the difficulty, according to the cook could have been caused by improper pressure in the field range.

Peanut Butter Cookies: These were easy to make, had an excellent flavor, but were extremely time consuming to pan and bake. As a result, this mealtime preparation was extended. It is suggested that preparation be as bars, or that preparation of cookies be done between meals.

Day 2 - Lunch

Grilled Hamburgers: These were prepared on an extremely cold day. Water for rehydration cooled rapidly, and as a result, the patties did not completely rehydrate and were tough. Of a panel of 38 testers 29 (76%) of the panelists made comments: 13 (34%) of the panel commented in toughness 14 (37%) in dryness and 5 (13%) made additional comments on the poor texture.

Hashed Brown Potatoes: Cooks used old potatoes that did not rehydrate well. Their color was very poor. Because the finished product also had an oxidized flavor, the ratings were disregarded.

Day 3 - Lunch

Chili Macaroni: Prepared from dehydrated Chili con Carne without beans, it was extremely chewy. Meat had a great deal of gristle. Of this panel of 58 testers, 19 (33%) made comments: 8 (42%) of these were on the presence of gristle and 9 (47%) commented on the dry taste.

Day 3 - Dinner

Scalloped Ham and Potatoes: By combining the dehydrated cheese with the sauce, an excellent product was obtained. Cheese sprinkled over the top of the finish product does not have high eye appeal. A change in directions for use was submitted.

Day 4 - Breakfast

This breakfast as a whole was rated low by the panelists because of the color. The oatmeal and beef are similar in color and appearance. However, there is no other cereal in the ration that could improve the appearance.

APPENDIX C (cont'd)

Day 4 - Lunch

Grilled Luncheon Meat in Pineapple Sauce: The luncheon meat was salty and over one-fourth of the testers rated it "5" or below. Similar comments were made from a hospital dietitian who used it in the field.

Day 4 - Dinner

Beef and Gravy with Vegetables: Of the 37 panelists tasting this product, 30 (81%) made comments on the meat component: 25 (68%) indicated that the meat was tough, 5 (14%) that it was chewy and 5 (14%) that it was dry. There was almost no visible fat on the dehydrated diced beef. The military specification calls for beef diced 1 in. by 1 in. by 3/8 in. The low rating (6.5) is not indicative of the recipe, but of the meat ingredient.

Day 5 - Lunch

Chocolate Cookies: These were prepared as bar cookies at the request of the users since the time consumed in baking cookies is excessive. Due to the extreme cold weather, the cookies dried out before serving. Care must be taken to cover them in the field to retain the texture.

Chiliburgers: The ratings suffered because of the toughness of the dehydrated beef patties. Of a panel of 46 persons, 33 (72%) made comments: 24 (52%) of the panelists commented that it was tough and 4 (9%) indicated it was dry.

Day 6 - Breakfast

Cheese Omelets: Many tasters were unfamiliar with the dehydrated egg mix and expected a quality like that of omelets made from whole eggs. Although the rating was only 6.0, the product is very good for a dehydrated mix.

Day 7 - Lunch

Barbecued Beef: Preparation was extremely simple and the resulting product excellent. This meal was one of the simplest to prepare; the oven was used only in baking off the Chocolate Brownies, which is less time-consuming than cookie preparation.

Day 7 - Dinner

Breaded Pork Chops with Cream Gravy: Utilizing the excess water used in rehydrating the pork chops reduces the amount of water needed for preparing 100 servings of the gravy by 2-1/4 gallons. Recipe preparation for this item is lengthy, but the dehydrated meat needs the moisture it retains when it is breaded. Frying-off unbreaded pork chops results in a tough product.

This meal as a whole was very time-consuming to prepare, because one cook had to spend his time preparing and baking cookies and was not available to help in breading the pork chops. It is suggested that the cookies be baked earlier if possible.

Day 9 - Lunch

Beef Patties Jerdinere: This recipe suffered from the low quality of dehydrated beef patties that were loaded with gristle. One of the cans was also a "leaker," and the meat was completely oxidized and had lost its color. Of the 46 panelists testing this product 14 (30%) made comments on the quality of the meat: 7 (15%) commented on toughness and 2 (4%) commented on the gristle.

Marble Cake with Chocolate Icing: Cold weather presented a problem by "setting up" the frosting for the cake almost before the sergeant had finished spreading it. When cooking in the field in cold weather, this problem will most likely be a serious one.

Day 9 - Dinner

This meal required the full-time work of the cooks, and was probably the most time-consuming to prepare. The reasons are as follows: (1) cookies had to be pan-fried then baked, (2) Macaroni and Cheese had to be made and baked, and (3) coating and drying the fish required the two military cooks. The menu as a whole was excellent.

Day 10 - Dinner

Baked Pork Chops in Tomato Gravy: The ratings suffered from the pork chops being cut against the grain. If they were not breaded, they would have been extremely tough. Of a panel of 39 persons 12 (31%) commented on the quality of the meat 9 (33%) commented on toughness and 2 (5%) commented that the chops were dry.

APPENDIX D

Sample B Ration Test Rating Sheet

This test is to ask your help in evaluating this meal which is part of the newly revised B Ration. B Rations are served in the field whenever refrigeration is not available but personnel to cook and serve are on hand. The menu is made from either canned or dehydrated foods.

After you have tasted the meal, will you please rate the items below. Check the rating which best describes how the product rates. Thank you for your help.

Chili con Carne

Cornbread

Menu as a Whole

Like Extremely

Like Very Much

Like Moderately

Like Slightly

Neither like nor

Dislike

Dislike Slightly

Dislike Moderately

Dislike Very Much

Dislike Extremely

COMMENTS: